We claim:

1. A method for determining the location of the accumulation fluids in a subterranean formation, comprising:

determining a first velocity vector "V_x" for migration of fluid in a region of interest in the subterranean formation, the first velocity vector comprising attributes of speed and direction of flow of fluid in a first direction in the region of interest;

determining a second velocity vector "V_y" for migration of fluid in the region of interest, the second velocity vector comprising attributes of speed and direction of flow of fluid in a second direction in the region of interest;

extrapolating the velocity vectors to identify the fluid accumulation location; and

wherein the first and second velocity vectors are primarily functions of supplementary pressure "dP" in the region of interest, the permeability "c" of the region of interest, and the viscosity "u" of the fluid in the region of interest.

2. The method of claim 1 wherein the supplementary pressure is determined by identifying pressure gradients within the region, said region being characterized by a seismic image, said seismic image comprising a stacked time section representing horizons within said region, comprising:

a) picking a first selected horizon from said seismic image;

b) calculating a set of instantaneous amplitudes and frequencies for said first selected horizon;

c) determining the average amplitude and frequency of said set of instantaneous amplitudes and frequencies;

d) identifying pressure gradients associated with said instantaneous amplitudes and frequencies to generate a pressure gradient map, said pressure gradients corresponding to points at which said instantaneous amplitudes and frequencies vary from said average amplitude and frequency, wherein points at which said instantaneous amplitudes and frequencies are less than said average amplitude and frequency correspond to locations of relatively low pressure.

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3. The method of claim 2 wherein said first selected horizon has associated traveltimes, and wherein said instantaneous amplitudes ~~and frequencies~~ are calculated by the Hillbert transformation using said traveltimes.

4. The method of claim 3 wherein said pressure gradient associated with said traveltime $dP^i(t^i c)$ is calculated using the formula

$$dP^i(t^i c) = (A^i c / A^0 c)^a (f^0 c / f^i c)^2.$$

5. The method of claim 1 wherein the velocity vectors are related to the permeability "c", the viscosity "u", and the of supplementary pressure in the region of interest dP by the equation

$$\vec{V}(T) = -(c/\mu)\ \nabla dP(T).$$

6. The method of claim 1 wherein the permeability "c" is calculated for selected values of the permeability "u" using the equation

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$$\nabla_A Pd = \frac{1}{2\pi}\int_S \frac{\mu_0}{c_0} q \frac{\mathbf{r}}{r^2} dS - \frac{1}{2\pi}\nabla_A \int_S \left(\frac{c\mu_0}{c_0\mu} - 1\right)\nabla_M P_d \frac{\mathbf{r}}{r^2} dS$$

where $\nabla_A = \mathbf{i}\ \partial/\partial x + \mathbf{j}\ \partial/\partial y$, $\nabla_M = \mathbf{i}\ \partial/\partial\zeta + \mathbf{j}\ \partial/\partial\eta$, $dS = d\xi\partial\eta$, $\mathbf{r}$ is a scalar $= (x-\xi)\mathbf{i} + (y-\eta)\mathbf{k}$, ζ and η are incremental lengths in the respective directions x any y,

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$A = \dfrac{\mu Q}{4\pi\sqrt{c_{xx}c_{yy}}}$, and Q is flow rate of the fluid in a portion of the region of interest.

7. The method of claim 1 wherein the permeability "c" and the viscosity "u" are obtained from geological data in the region of interest.

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8. The method of claim 1 wherein the first velocity vector "V_x" is calculated using the equation $V_{x(y=0)} = \frac{1}{x}\frac{Q}{2\pi}\sqrt{\frac{c_{xx}}{c_{yy}}}$, and the second velocity vector "V_y" is calculated using the equation $V_{y(x=0)} = \frac{1}{y}\frac{Q}{2\pi}\sqrt{\frac{c_{yy}}{c_{xx}}}$, and wherein Q is flow rate of the fluid in a portion of the region of interest.

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